

user's guide

Multi

Image

Processing

System

Designed and manufactured in Fredrikstad, Norway.

 **projectiondesign**

 **projectiondesign**

POWER



STATUS

POWER



STATUS

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Introduction

Thank you

Thank you for purchasing a MIPS processor.

The MIPS WB2560 and WB1920 are state-of-the-art image processing engines for the combination and setup of multiple projectors in order to create one, large, seamless image. By combining multiple projectors, images with unprecedented resolution and fidelity can be created.

The MIPS processors feature unique functionality and unmatched compatibility, and are perfectly tailored to working with projectiondesign projectors for use in multi-image environments.

Features

- Geometry correction
- Blending and overlap
- 2560x1600, and 1920x1200 models available
- User selectable algorithm setups
- 4x4 Lanczos scaling
- Bi-linear scaling
- B-cubic scaling
- Project onto any surface
- Zero, or near zero latency, depending on set up and configuration
- 3D stereo compatible, up to 1920x1200 on WB2560, and 1280x800 on WB1920
- Patented Black Level Matching for uniform black levels
- Per-pixel Colour-, Uniformity-, and brightness matching
- 12-bit internal resolution
- Dual-Link DVI-D in / out
- All control through Ethernet
- Built-in power supply for easy power management in large racks
- Integrates seamlessly with projectiondesign ProNet MIPS software setup suite
- Rack mount, ½ width, 1U height
- Unlimited scalability and channel count
- Fully transparent to source, no special software or source requirements

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Best practice

When setting up a MIPS based projection system, it is important to keep the following guidelines in mind:

- A system is only as good as the weakest link - make sure cables, connectors, infrastructure and IG's are top level.
- A system's performance can almost always be improved – and there is no substitute for experience in, and knowledge about the components in it

SAFETY

This device complies with safety regulations for Information Technology Equipment intended to operate in "normal" environments (offices and homes). Before using the device for the first time, please read the safety instructions thoroughly.

GENERAL WARNINGS

Use only the cables and cords supplied with the device or original replacement cables. Using other cables or cords may lead to malfunction and permanent damage of the device.

Always use 3-prong / grounded power cord to ensure proper grounding of the device. Never use 2-prong power cords, as this is dangerous and could lead to electrical shock.

Never open the device. The device contains no user serviceable parts. Refer all repairs to qualified personnel only. Make sure that no objects enter into the vents and openings of the set.

Do not spill any liquids on the device or into the vents or openings of the device.

Always remove protective plastic covering the device before operating the device.

Only place the device on a stable surface, or mount it securely in a rack.

Do not drop the device.

The device can be used as desktop or rack mounted with the certification labels facing down. Any other mounting directions are not allowed. When rack mounted, care must be taken to keep ventilation on back and front side open. Operating the device in other positions may lead to overheating, resulting in malfunctioning.

Always allow ample airflow through the device. Never block any of the air vents. Never cover the device in any way while running. Allow for sufficient distance to walls and other obstructions to avoid overheating.

Minimum safety distance to front or rear of the device is 20 cm (8") to rear and 5 cm (2") to front.

The device is designed for indoor use only. Never operate the device outdoors.

Do not operate the device outside its temperature and humidity specifications, as this may result in overheating and malfunctioning.

Only connect the device to signal sources and voltages as described in the technical specification. Connecting to unspecified signal sources or voltages may lead to malfunction and permanent damage of the device.

WEEE INFORMATION

This product conforms to all requirements of the EU Directive on waste electrical and electronic equipment (WEEE). This product shall be recycled properly. It can be disassembled to facilitate proper recycling of the individual parts.

Consult your dealer or relevant public authority regarding drop-off points for collection of WEEE.

WARNING ABOUT SUBSTANCES

This product contains chemicals, including lead, known to the State of California to cause birth defects or other reproductive harm. Recycle properly, do not dispose of in ordinary waste!.

WARNING SYMBOLS

-  **READ USER GUIDE Attention!** Read the user guide for further information!
-  **RECYCLE Warning!** Recycle properly, do not dispose of in ordinary waste!
-  **NO TELEPHONE Warning!** Do not connect to telephone lines!

What's in the box?

The MIPS processor comes with the following components:

MIPS processing unit



Power Cable (Country Dependant)



2x Dual Link DVI cables



CD with software



Network cable



User Documentation



Please verify that you have all components upon unpacking the unit, and its contents.
Please save packaging materials for future use, should it be necessary to ship the unit.

Installation and setup

The following section outlines the general requirements to supporting equipment in order to run the MIPS plugin, and successfully setting up a MIPS based projection system.

System requirements

ProNet 2.0 – required to set up and operate MIPS processors, works with Microsoft Windows® operating systems only. The following versions are supported:

- Windows XP (32-bit only), SP xx or
- Windows Vista (32- or 64-bit)
- Windows 7 (32- or 64-bit)

In addition, Microsoft .NET Framework 3.5 or later must be installed.

Any standard computer capable of running the above operating systems should work, but for best performance, the computer running ProNet 2.0 should have at least:

- Intel® Dual Core™ architecture or similar.
- 2 GB of RAM
- 200 MB of free disk space
- 1.0 Gigabit Ethernet interface



NOTE! For the ProNet application to be displayed correctly, 96 DPI must be used (Windows Default).

System overview

A MIPS system contains the following main components:

- An Image Generator (IG) with one or more channels (outputs) (not provided by projectiondesign).
- One MIPS unit per channel
- One projector per channel
- A PC for setup and control
- Optional camera or other auto-alignment tool (not provided by projectiondesign)
- Optional CAD tool for designing systems (not provided by projectiondesign)

Figure 5-1 shows a complete system overview of a MIPS setup.

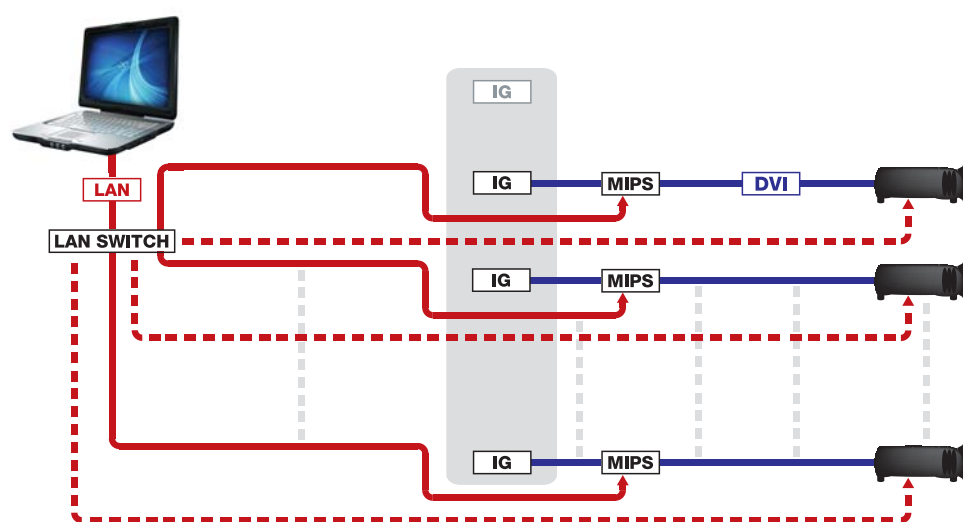


Figure 5-1. MIPS system overview

Network settings

For optimum performance during calibration, a 1.0 Gbps Ethernet connection is recommended. 100 Mbps will also give adequate performance.

The communication between the control PC and MIPS units is based on a bi-directional XML protocol. For this to work properly, any firewall between Control PC and MIPS units should be disabled.

Software

To use MIPS system, ProNet.Site and the ProNet.MIPS plugin must be installed on a control PC.

The latest version of the software can be found at www.projectiondesign.com

A license key is required to use the software. The key can be acquired by contacting an authorised projectiondesign representative.



NOTE!

NOTE! ProNet.Site must be installed before the ProNet.MIPS plugin is installed.

Mounting the MIPS processor in rack

Each MIPS processor is half-width, 1U standard size, so two channels can be combined in a single standard 19" 1RU rack mounting plate, available from projectiondesign. Remove the upper and lower screws on each side of the MIPS processor, position the mounting plate and reenter the screws as shown in Figure 5-2 and Figure 5-3.



Figure 5-2. Rack mount plate



Figure 5-3. Rack mounted

Getting to know the GUI

ProNet.site

Figure 6-4 gives an overview of ProNet.site. The application has four main areas of interest:

- The File menu located in the top-left corner.
- The “Site Devices” overview on the left hand side of the GUI.
- Control, status, monitoring and timed operations overviews for one or more selected devices on the right hand side.
- Status messaging window at the bottom.

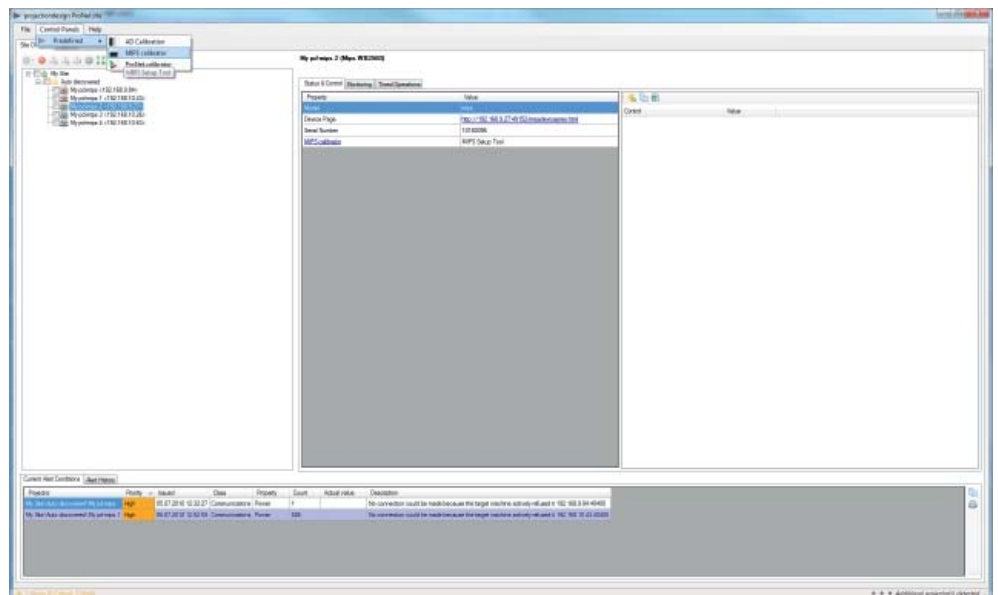


Figure 6-4. Overview of ProNet.site

To start the MIPS calibrator plugin, select “Control Panels” > “Predefined” > “MIPS calibrator”.

MIPS Calibrator – Device View

Figure 6-5 shows the “Device View” window that is displayed when the “MIPS Calibrator” plugin is started. The “Device View” window contains the following areas:

- The File menu located in the top-left corner
- The Device Pool window in the lower left corner.
- A MIPS information window in the lower right corner.
- A dedicated toolbar on the left hand side.
- A Device View Desktop that is displayed in the center of the ProNet application window. All MIPS units added to a project are shown here along with their arrangement.

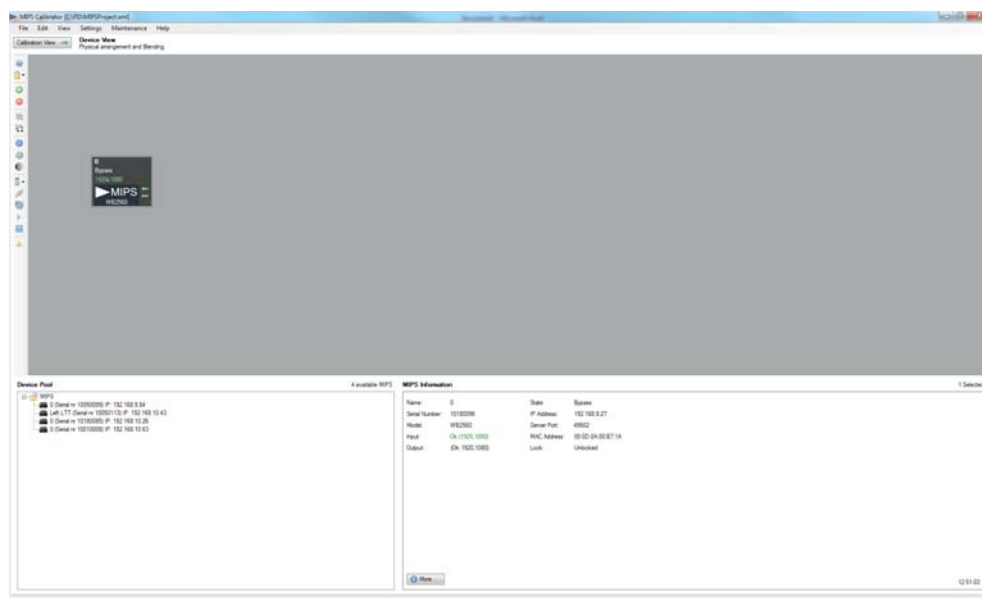


Figure 6-5. MIPS Calibrator, Device View.

Creating and saving a MIPS system setup project

When starting the MIPS calibrator, a new project will be started automatically. In the Device View, a project contains the MIPS units added, and their arrangement in the Device View desktop. Projects can be saved and opened on the control PC. This is done from the File menu. See Figure 6-6.

Note! Project files are saved as XML files. Project files are saved on the control PC, not in the MIPS unit itself.

Backing up and restoring calibration

Calibration files for each MIPS unit in a project can be backed up or restored from the File menu.

Backup files are stored on the control PC, not in the MIPS unit itself.

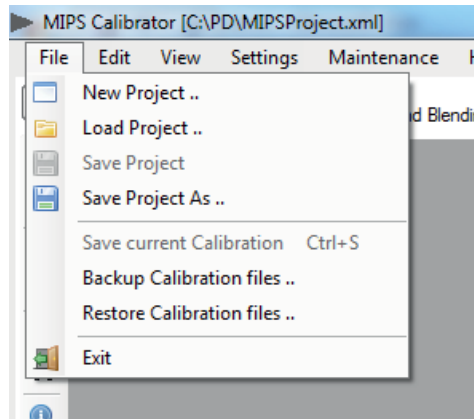


Figure 6-6. File menu, Device View.

Adding MIPS units to a project

To enable and add MIPS units to a project, simply drag and drop units from the tree view in the Device Pool (Figure 6-7) to the Device View Desktop. The MIPS units in the Device Pool are detected using ProNet's built-in universal plug-n-play capability.

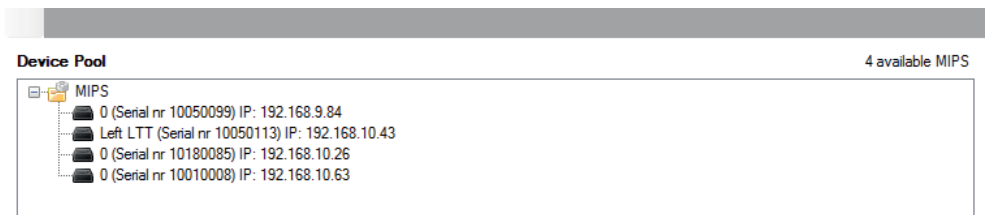


Figure 6-7. The Device Tree in the Device Pool.

MIPS units can also be added or deleted from the Device View Desktop by using the  and  icons in the toolbar.

Using the Device View Toolbar, DVT

The Device View Desktop window has a toolbar on the left hand side, known as the Device View Toolbar. The toolbar can be shown with or without help text. See Figure 6-8.

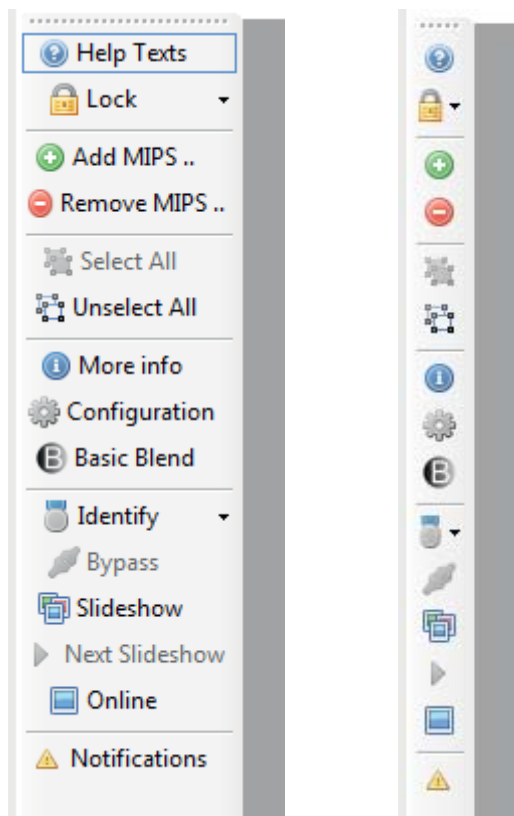


Figure 6-8. Toolbars, shown with and without help texts.

Using the toolbar you can:

- Add or remove MIPS units from a project.
- Select or deselect all MIPS units on the Desktop.
- Show an information window for a selected unit. The information window shows system status (temperature, fan operation, DVI signal detection in/out) and system versions for software, hardware, FPGA, and more.
- Using the Configuration tool, Visual ID (on screen identification) and custom notes are configured. System latency is also set up from this menu.
- The Basic Blend page sets the number of overlapping pixels for the selected channel(s). The blend drop-off curve is also configured here.
- Identify is used to configure display of visual ID information, and identify units on the Desktop. Extended visual ID mode will, in addition to showing your custom Visual ID, show network information and serial number of the unit.
- Bypass sets the unit in bypass mode. No processing occurs.
- Slideshow mode shows a set a predefined test images stored in the MIPS processor. In Slideshow mode all image processing is applied.
- Next Slideshow selects the next test image in the unit.
- Online. This switches the processor to full processing mode. The signal on the DVI input will be processed according to set calibration and passed to the DVI output connector.

Most of the features accessed from the toolbar menu are also available by right-clicking a selected unit, and choosing it from the context sensitive menu that shows up.

Clearing calibration

To clear calibration from selected MIPS units, select Edit > Clear Calibration from the File menu. Under Clear Calibration, one can select to clear all or just parts of the calibration. See Figure 6-9.

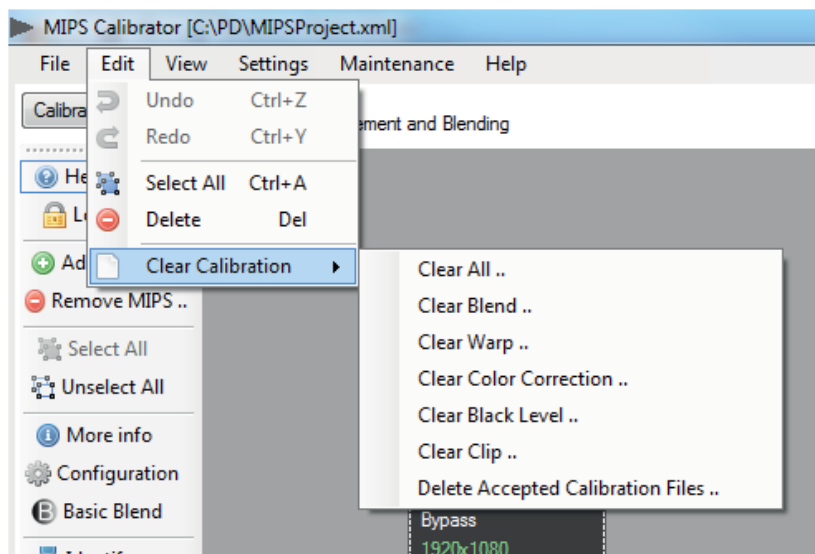


Figure 6-9. Clearing calibration

Notifications and advanced network settings

Under Settings > Application Settings, message notification levels and advanced network settings are configured, see Figure 6-10.

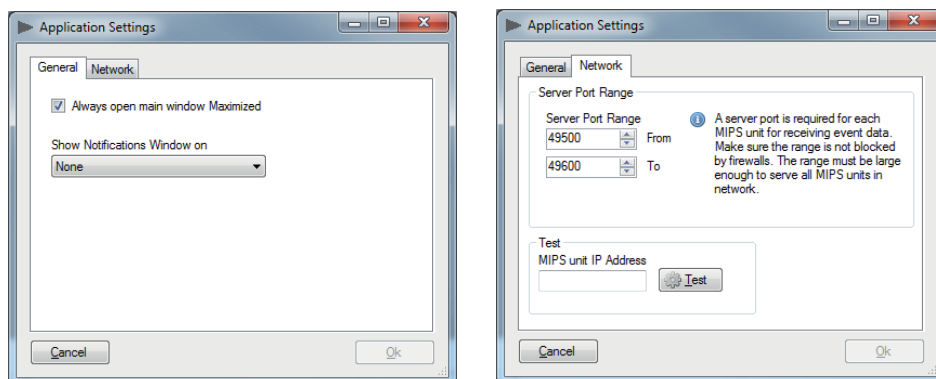


Figure 6-10. Application and Network settings.

Performing software upgrades

All MIPS units can easily be upgraded via the ProNet 2.0 user interface. System software is available from www.projectiondesign.com. Select Maintenance > MIPS Unit Software Update. The window shown in Figure 6-11 appears. Locate the system update file(s), and click "Select..". After the file has loaded successfully into the update application, click "Start".

IMPORTANT: This is just the first step in the upgrade process. When the progress bar has reached 100%, the unit will start to reconfigure itself for the new software. This configuration can take between up to 15 minutes.

IMPORTANT: Do not unplug the power during this process!

The software update process is complete when the power status LED on the unit is showing a steady blue light.

IMPORTANT: When the software update process is complete, cycle power.

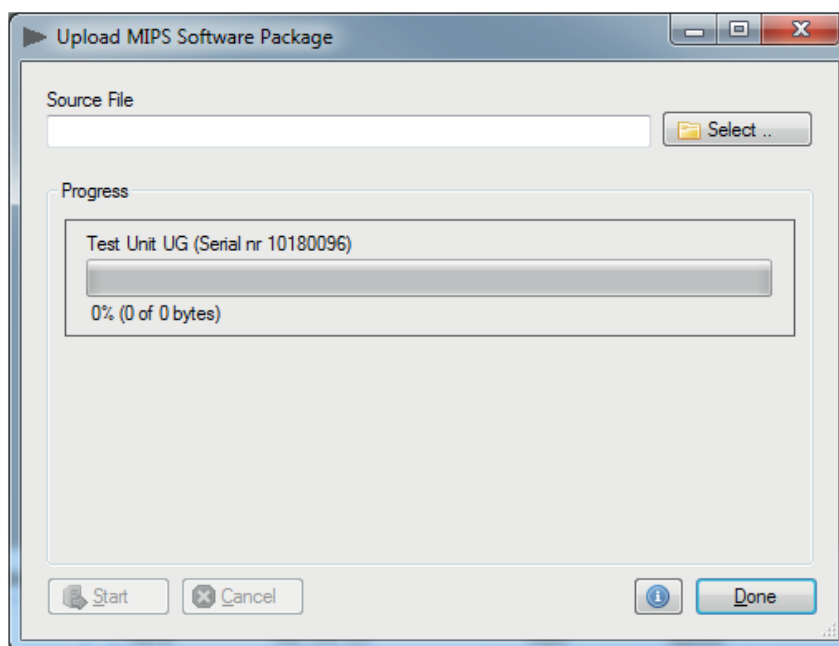


Figure 6-11. MIPS software upgrade window.

Controlling EDID information

The unit defaults to giving the image generator either WUXGA or WQXGA EDID data depending on the version of the MIPS unit that is in use. EDID data can also be configured manually, or the unit can pass EDID data information from the projector directly to the image generator (referred to as "EDID sink").

To manipulate EDID setting, select Maintenance > EDID Administrator. Select the EDID file you want to use and click "Activate". For passing the EDID data directly from the projector to the image generator, select `edid_sink.bin`. The EDID Administration window is shown in Figure 6-12.

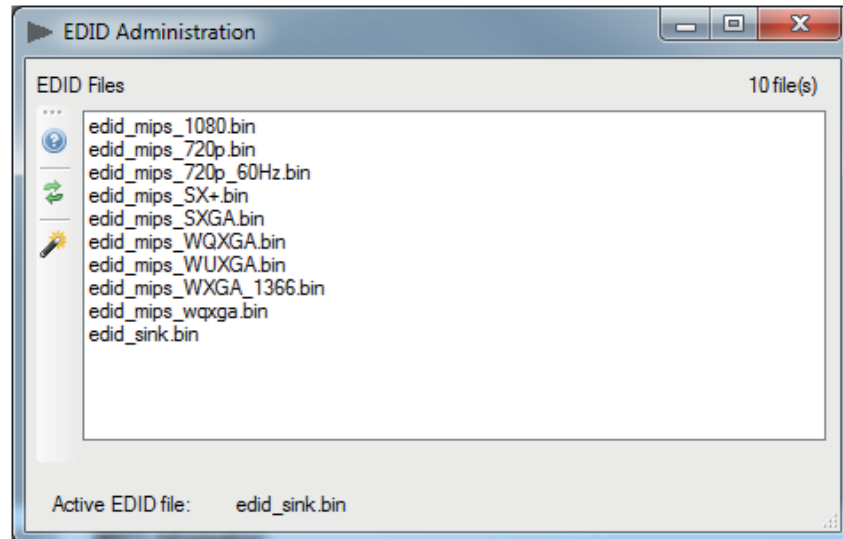


Figure 6-12. EDID Administration.

MIPS calibrator – Calibration View

When all MIPS units are added to the project in the Device View, switch MIPS Calibrator to “Calibration View”. This is done by clicking the “Calibration View” button in the top-left corner. Clicking the same button in Calibration View mode will bring you back to Device View. See Figure 6-13.

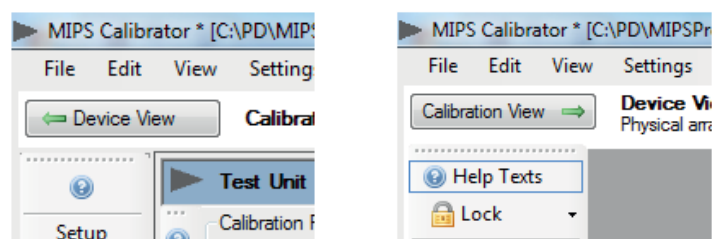


Figure 6-13. Switching views from Calibrator view to Device view and back.

Using the Calibration View Toolbar (CVT)

Like in Device View, Calibration View has its own toolbar on the left hand side of the screen. This is called the Calibration View Toolbar, CVT. The toolbar can be shown with or without help texts, Figure 6-14. To enable the help texts, click the question mark.

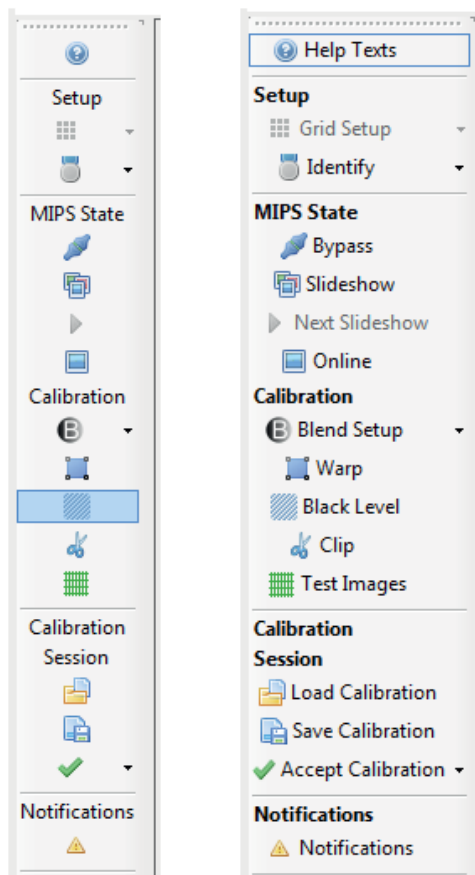


Figure 6-14. Calibration toolbar, without and with help texts.

Selecting/deselecting MIPS units

The MIPS Navigator is a window used to select MIPS units in a project, Figure 6-15. In this window, MIPS units can be selected or deselected either by clicking on them or using the assigned short cut key combination.

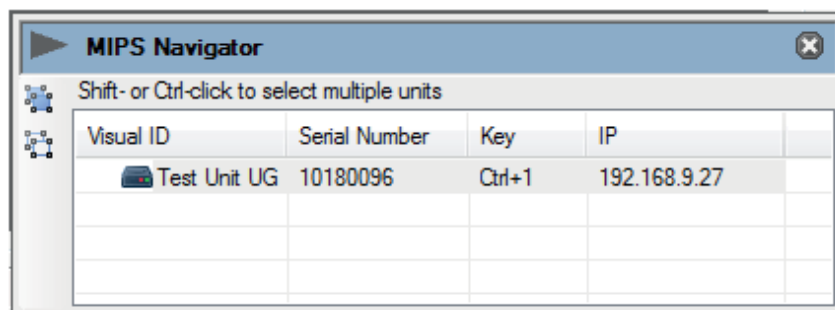


Figure 6-15. MIPS Navigator

Similar selection capabilities can be found in the top toolbar, Figure 6-16. In this toolbar automatic arrangement of open windows can also be done.

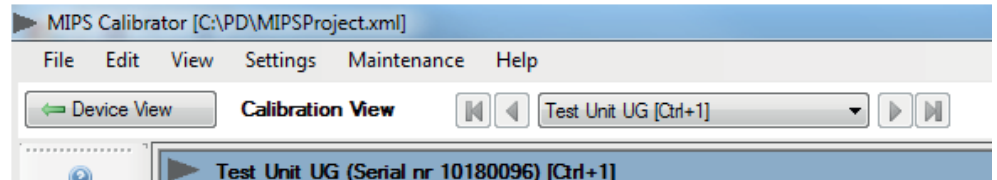


Figure 6-16. Top toolbar window navigation

Using the Calibration Panel Toolbar (CPT)

The calibration panel has a set of tools on the left hand side of the window. This toolbar can be shown with or without help texts, Figure 6-17.

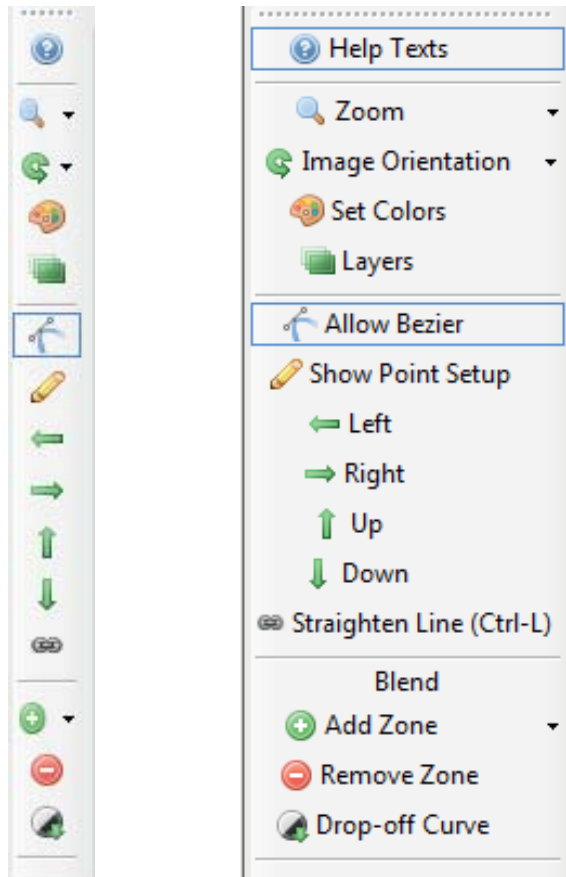


Figure 6-17. Calibration Panel Toolbar, without and with help texts.

The Calibration Panel Toolbar has these main functions:

- Zoom. Scale the work area in the calibration panel.
- Image Orientation. Change the orientation of the calibration panel to match the physical orientation of the projector.
- Set Colors. Set the color for background, lines, control points and internal test patterns. see Figure 6-18.

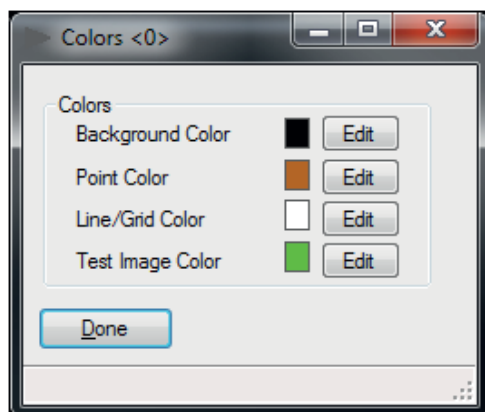


Figure 6-18. Set colors control box

- Layers. Calibration layers for warping, blending, test patterns and other can be turned on and off for easier setup.
- Allow Bezier. When using the Mesh Bezier Warp or Bezier lines in the clipping (masking) or black level management feature, the Bezier functionality (control points) can be turned off. The selected line will have a linear behavior.
- Up, down, left, right arrows. Used to move a selected control point 1 pixel in given direction. Ctrl+arrow keys on the keyboard can also be used.
- Straighten lines. Can be used to straighten selected Bezier lines (short cut key: Ctrl+L).
- Bottom section of the Calibration Panel Toolbar, has a different button depending on which calibration is being performed. Figure 6-17 shows the tools for advanced edge blending.

MIPS operational states

MIPS can operate in 5 different states: Bypass, Calibration, Online, Slideshow or Auto. Switch between the different states using the action toolbar.

Bypass states

The DVI input signal is bypassed through the system and passed to the DVI output.

Calibration state

Calibration mode is used to configure the system. Different testpatterns will be shown depending on what type of calibration is being performed (warp, blend, masking etc.). The MIPS unit will automatically enter calibration state upon clicking on any of the calibration tools in the actions toolbar.

Online state

In online state the DVI input signal is processed according to the calibration and sent to the DVI output.

Slideshow state

In slideshow state a set of predefined test images are processed according to the calibration and showed on the DVI output. No input signal is required to use this state.

Auto state

When a calibration is completed and the accepted calibration is stored in MIPS unit auto state will be used upon power up of the unit. If the MIPS find a stored calibration that matches the input resolution, the online will enter online state (image processing enabled). If no calibration is found, the unit will be in bypass state.

Geometry correction

Image Geometry Correction (often referred to as Image Warping) is the process of digitally manipulating image data so that the image's projection precisely matches a specific projection surface or shape. Image Geometry Correction compensates for the distortion created by off-axis projector or screen placement or non-flat screen surfaces by applying a compensating inverse distortion to the image in the digital domain. Usually, Image Geometry Correction is applied so that areas of the projection surface are perceived by the viewer to map to the corresponding areas in the source image.

Warping algorithms

The MIPS system is supporting 3 different warping algorithms: Perspective, Mesh Warp Smythe, Mesh Warp Bezier. The best way to understand how they work is to test the different algorithms in an actual system setup. One projector and one MIPS unit is enough to learn how they work.

Note! Image Geometry Correction is not applied until operational mode is changed to "online".

Perspective

This is advanced keystone. Only the four corners of the image can be manipulated.

Mesh Warp Smythe

This is recommended for use on simple, maybe slightly curved screens. Number of control points can be dynamically added. Start off with a few control points and increase the grid size as needed. When the grid is increased, the position of any added point in the finer grid mask will be given a correct position automatically. Max grid size is 16x16.

Mesh Warp Bezier

This is a very powerful tool where you can manipulate not only the control points of the grid, but also the tangent vectors connected to every control point. The control points of the tangent vectors are called Bezier control points.

Bezier patch meshes are superior to meshes of triangles as a representation of smooth surfaces, since they are much more compact, easier to manipulate, and have much better continuity properties. In addition, other common parametric surfaces such as spheres and cylinders can be well approximated by relatively small numbers of cubic Bezier patches.

Max grid size is 16x16, but the flexibility of this algorithm usually allows for correct geometric distortion with very few control points.

Warping user interface

To apply warping to an image, select "Warp" from the left hand toolbar. The window in Figure 7-19 will appear.

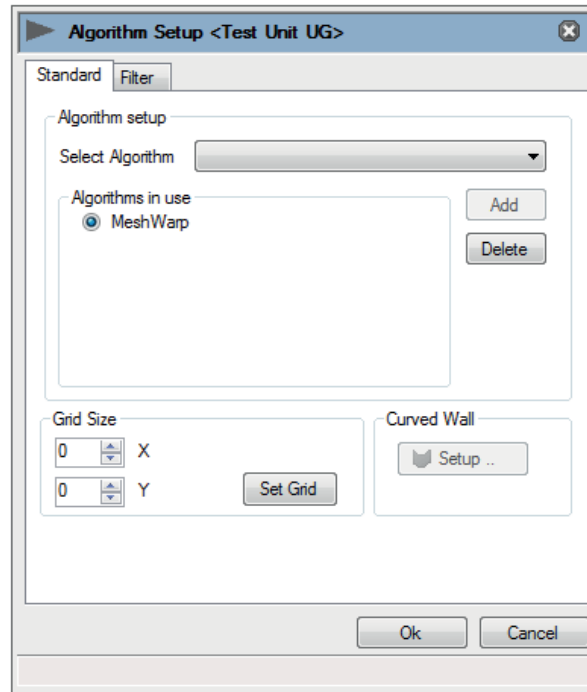


Figure 7-19. Warping algorithm setup

Algorithms can be added or removed. If the perspective transform is added first, Mesh Warp Smythe can be used in addition. If Mesh Warp Smythe or Mesh Warp Bezier is added first, a combination of algorithms is not allowed.

In this window, grid size is also configured. For the control points of an algorithm to be visible, the grid size is must be at least 1x1.

Increasing grid size during calibration is very convenient. This enable for rough calibration with few control points, and fine tuning with increased grid size as needed.

Decreasing grid size during calibration is not recommended as you may lose fine tuning data you have already added to the grid.

Scaling filters

Regardless of the warping algorithms selected, a scaling filter will be applied. Scaling filters are configured using the Algorithm Setup window. Select the tab "Filter", Figure 7-20, and select your desired filter. Four different scaling filters are supported:

- Lanczos
- B-spline
- C-spline
- Linear

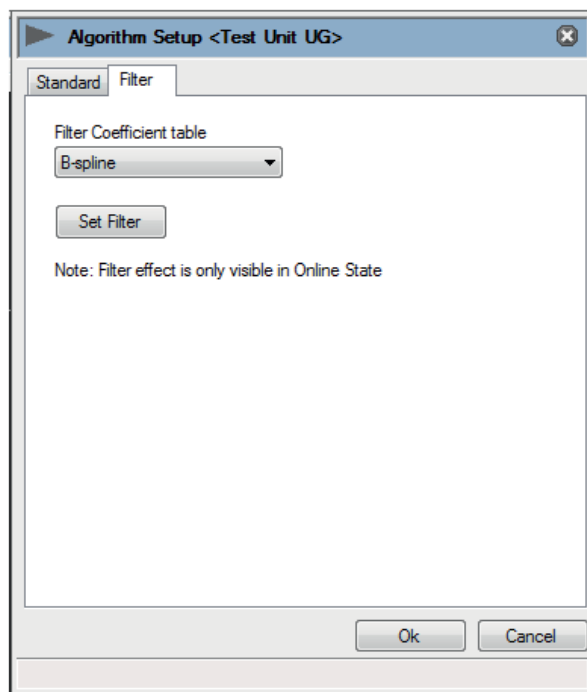


Figure 7-20. Scaling filters

Lanczos filter

The Lanczos filter is using a 4x4 kernel. This filter is recommended for use with images that contains large amounts of fine detail, for example text with small fonts. On thin, diagonal or curved lines, some ripple may be encountered.

B-spline filter

The B-spline filter available in MIPS is of the type Cubic B-spline. This filter is slightly softer than the Lanczos filter, but has better quality on curved and straight lines. In many cases, this filter will give the best image quality and is therefore the default selection.

C-spline filter

The C-spline filter is short for Cubic Hermite spline interpolation. It is a filter of third-degree spline with each polynomial of the spline in Hermite form (Named in the honor of Charles Hermite). This filter gives a good combination of smoothness, detail and average ripple on lines.

Linear interpolation filter

This filter is also a polynomial filter, but is based on linear interpolation for curve fitting. In modern systems, it will give an un-necessarily low quality image scaling, but some applications may still require the use of this filter.

Working with the perspective algorithm

To start working with the perspective algorithm, click the “Warp” icon, add the perspective algorithm and set grid size to 1x1. To map the geometry to the surface being projected on by dragging the control points with the mouse. Figure 7-21 shows basic usage of the Perspective algorithm.

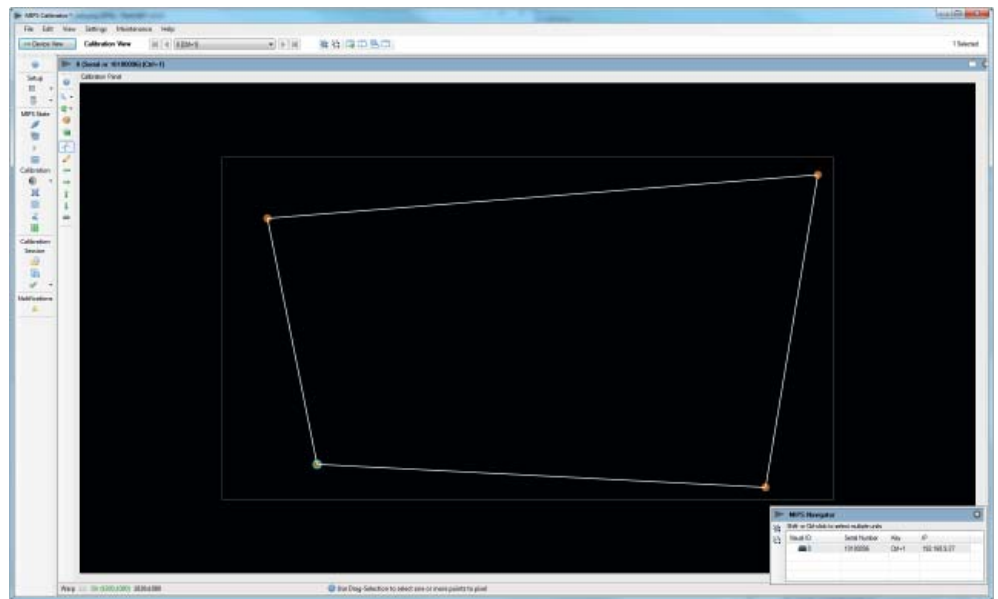


Figure 7-21. Working with the perspective transform

Working with the Mesh Smythe algorithm

To start working with Mesh Smythe algorithm, click the “Warp” icon, add the Mesh Smythe algorithm and start with setting the grid size to 1x1. First map the four corners to their desired location. As required, increase the grid size. This will add more rows, columns and control points to the mesh and enable the possibility to map the grid correctly onto the surface. Figure 7-22 is showing a simple 3x3 grid using the Mesh Smythe algorithm. Even though the lines between the control points are not smoothly curved in the user interface, they will be in the MIPS unit and hence on the screen.

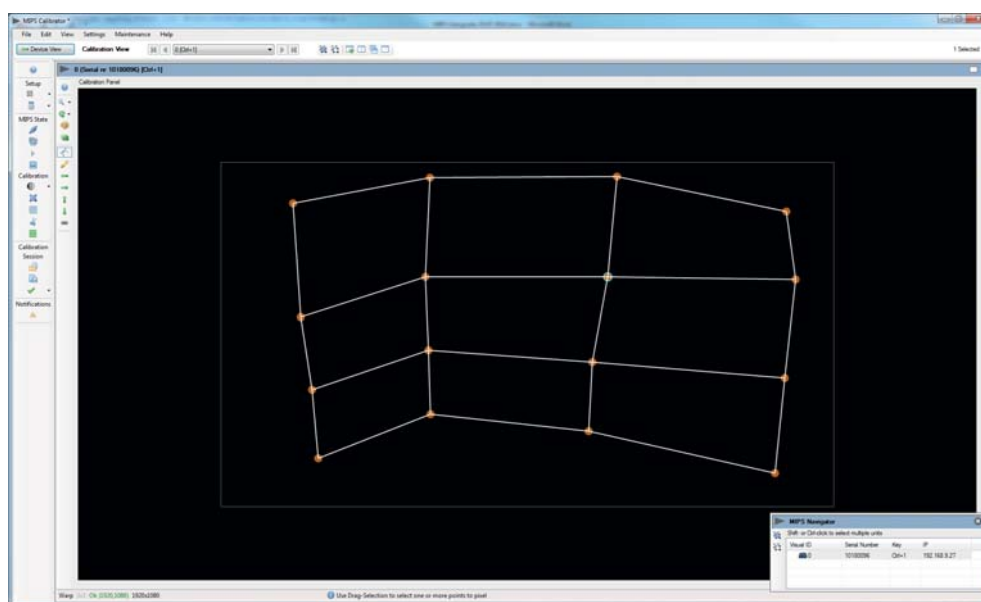


Figure 7-22. Working with the Mesh Smythe algorithm

Working with Mesh Bezier algorithm

To start working with Mesh Bezier algorithm, click the “Warp” icon, add the Mesh Bezier algorithm and start with setting the grid size to 1x1. The grid you see now will contain four control points – one in each corner. In addition all control point will have 2-4 additional, white control points for controlling the Bezier vectors in a given point, Figure 7-23.

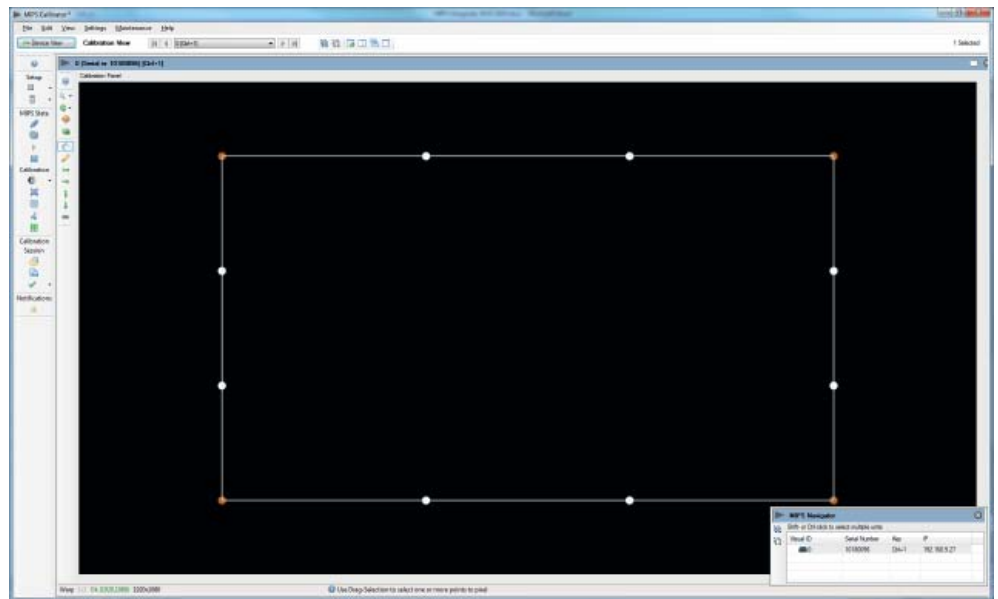


Figure 7-23. Mesh Bezier with 1x1 grid

First map the four control points (orange) to their desired location. Then move the Bezier control point to curve the lines between to control points to map the screen geometry (Figure 7-24). When using this algorithm, geometry mapping to cylinders, spheres and other well defined surfaces can be done with very few control points. Like with the Mesh Smythe algorithms, the grid size can be increased as much as needed to get the required accuracy for a given surface. A 1x1 grid should regardless of the projection surface be used as a starting point.

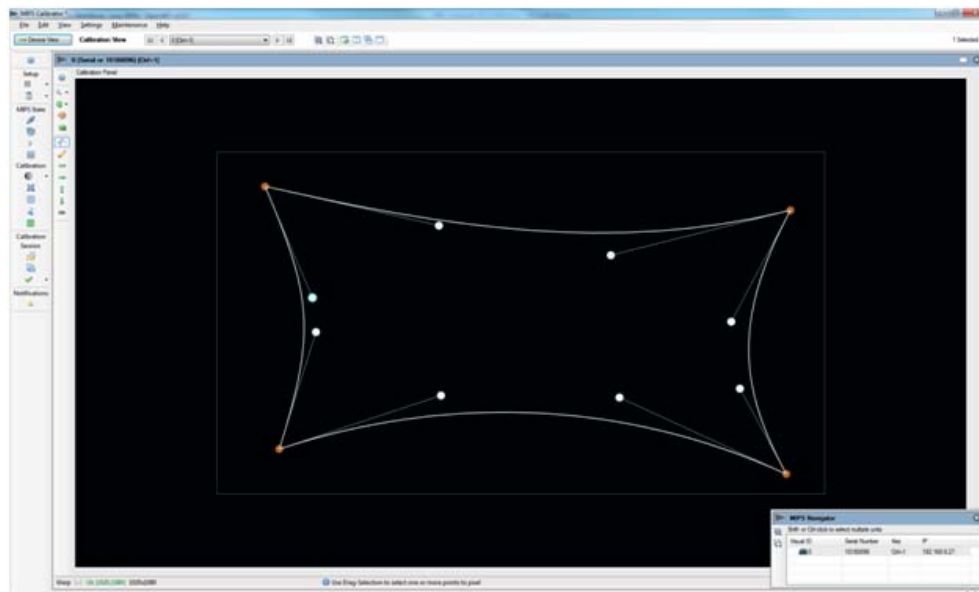


Figure 7-24. Working with Mesh Bezier, simple mapping

Fine tuning control points

To fine tune the position of a warping control point, first click on the control point. Then press and hold Ctrl while using the arrow keys on the keyboard to move the control point.

Edge blending

Introduction

Edge Blending is a companion feature to Image Geometry Correction. Edge Blending enables the seamless projection of a large image using several overlapping projectors. Since geometry correction for projection on non-flat surfaces is a built-in requirement in almost all Edge Blending systems, the pairing of Edge Blending and Image Geometry Correction in the same video signal processor is a natural one.

Edge blending algorithms

MIPS support two different types of edge blending: Basic and Advanced

Basic edge blending

Basic edge blending is used for simple and slightly curved surfaces. A percentage or a defined number of overlapping pixels is specified. The overlapping region of each side (top, bottom, left, right) of the image is then geometry corrected with the warping that is being applied to the image.

Advanced edge blending

Advanced edge blending is used for more complex surfaces like a dome (spherical). With advanced edge blending, warping and blending is completely disconnected. After correct geometry correction has been applied, multiple blend areas are defined to create the seamless image.

User interface for basic edge blending

To apply basic edge blending to an image, select “Blend” from the left hand toolbar, and select Basic Blend Setup. The window in Figure 8-25 will appear.

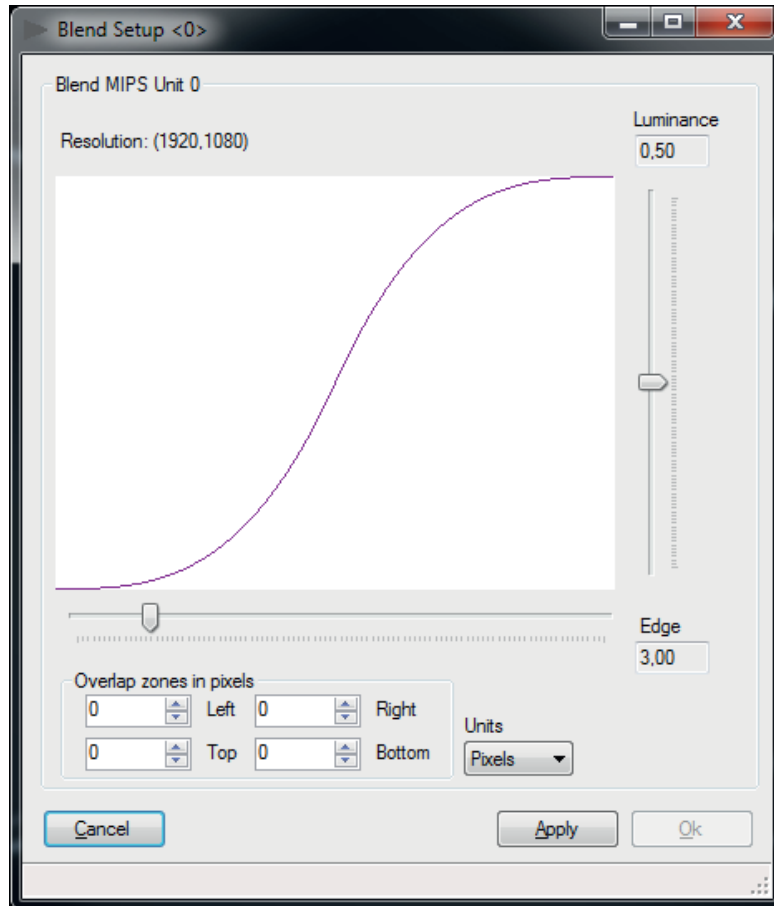


Figure 8-25. Basic edge blending.

In the Basic Blend setup window, overlapping pixels (or percent) can be specified. The blend drop-off curve of can also be tuned. Tuning the blend drop off curve is also possible when the unit is in Online state, for a visual fine tuning of the curve.

User interface for advanced edge blending

To apply advanced edge blending to an image, select “Blend” from the actions toolbar, and select Advanced Blend Setup. All blend zones will now have to be added manually. Click “Add zone” and select a default location for the blend zone, see Figure 8-26.

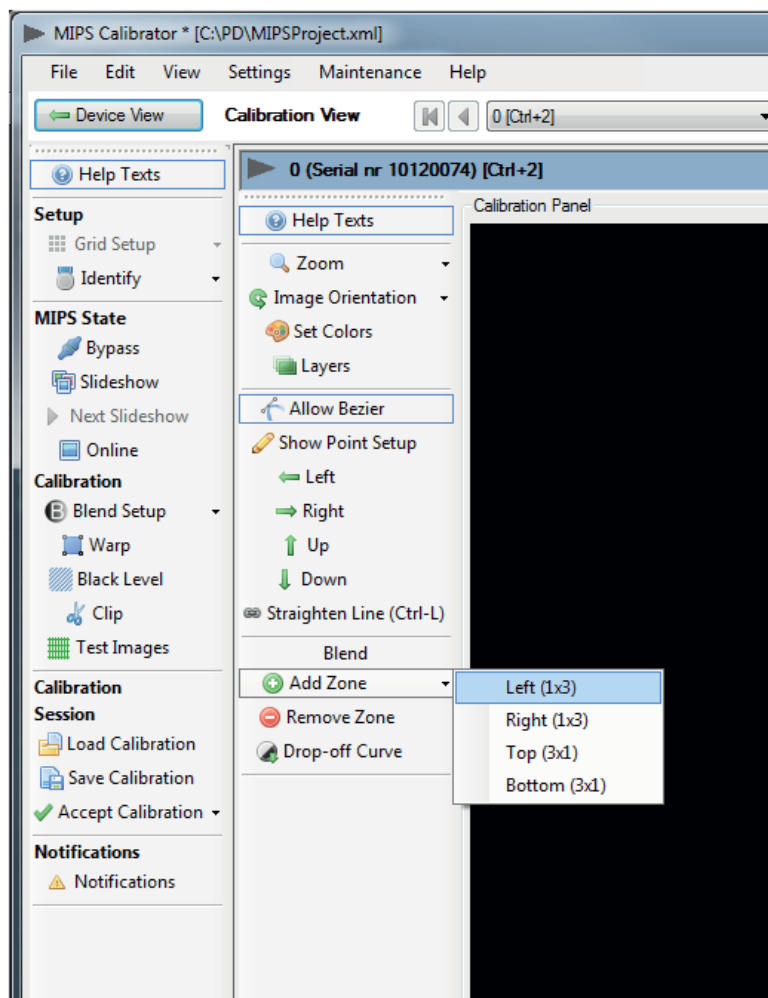


Figure 8-26. Adding a blend zone.

The “Add Blend Zone” window in Figure 8-27 will appear. Configure the initial parameters for the blend zone and click “Add Blend Zone” to add it to the UI. “White” means the location of the full on side of the blend zone (white line). “Black” means the location of the full off side of the blend zone (black line). These blend zone will be completely disconnected from the warping and should hence be applied after the geometry correction is complete.

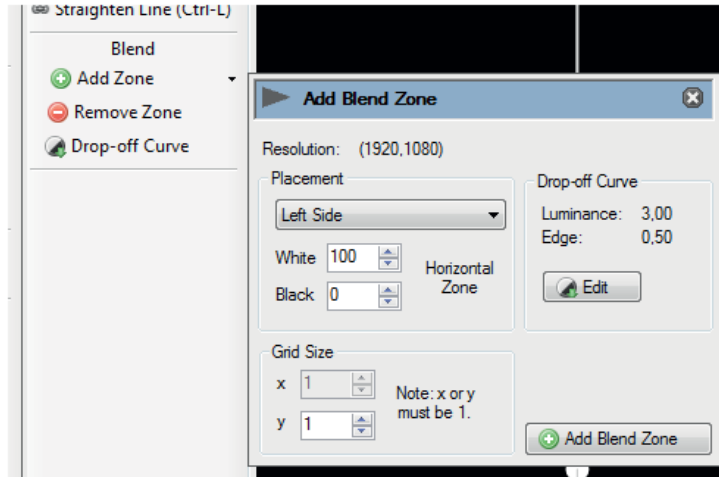


Figure 8-27. Add blend zone window.

Adjusting the shape of advanced edge blending zones

Working with the advanced edge blending zones is very similar to the controls of Mesh Warp Bezier. All control points and Bezier points can be used to create the correct shape for the blend zones. Figure 8-28 shows two blend zone, top and left, where adjustments for perfect fit have been done.

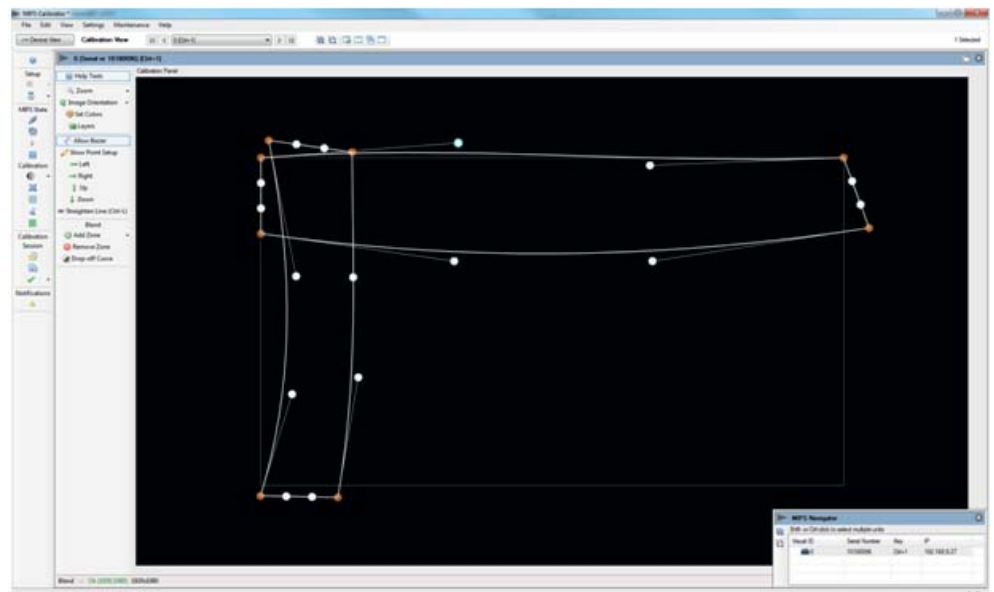


Figure 8-28. Working with advanced edge blending.

Adjusting the blend drop-off curve

The drop-off curves can be configured individually for all blend zones. Click on a control point in the blend zone you would like to adjust, or select multiple points or blend zones with by dragging a selection rectangle over the areas of interest. Then select “Drop-off Curve” in the Calibration panel toolbar. Adjust the drop-off curve with the vertical and horizontal sliders, as illustrated in Figure 8-29.

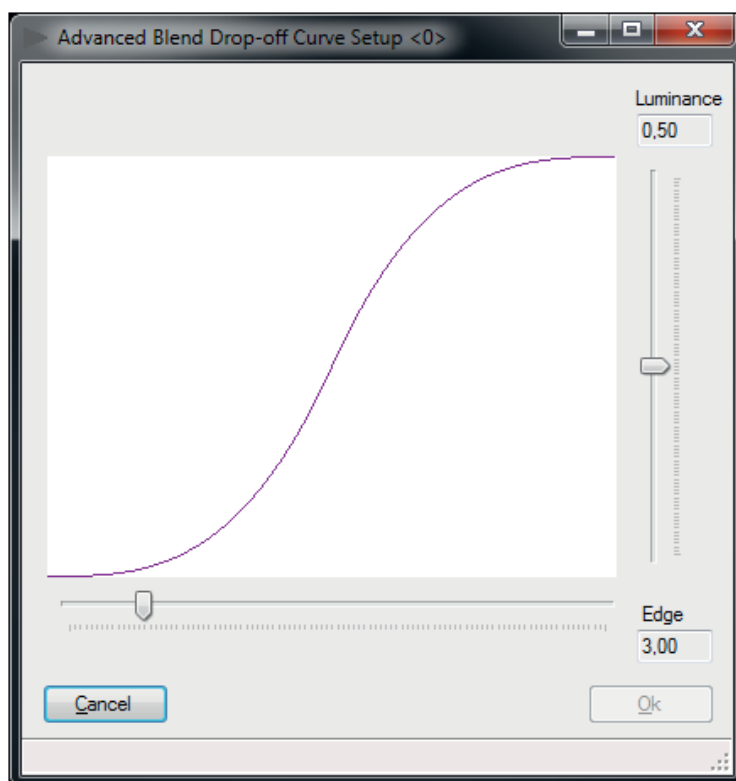


Figure 8-29. Adjusting the blend drop off curve.

Test patterns

MIPS has several built-in test patterns for easier setup. This tool can be used to tune the geometry (warping) in a setup to match reference points, aspect ratio, ensure visual correctness and to configure 3D image generators for shapes like cylinders and domes. The test patterns are:

- Circles. Add circle to your calibration view to visually configure for aspect ratio.
- Grid (Pixel). Specify a grid with height and width (in pixels) of all cells in the grid.
- Grid (Angle). Specify a grid with horizontal and vertical degrees for setup in domes or cylinders.

Multiple test patterns can be used simultaneously.

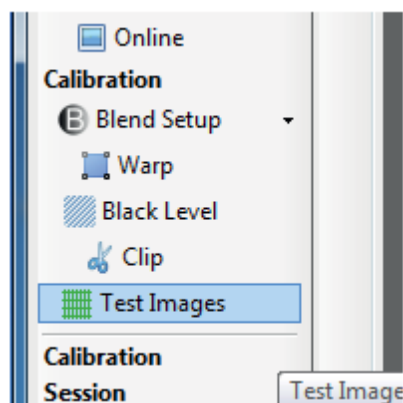


Figure 9-30. Adding test patterns

To add a test patterns to the calibration view, click "Test Images" in the actions toolbar. See Figure 9-30. The window in Figure 9-31 will appear.

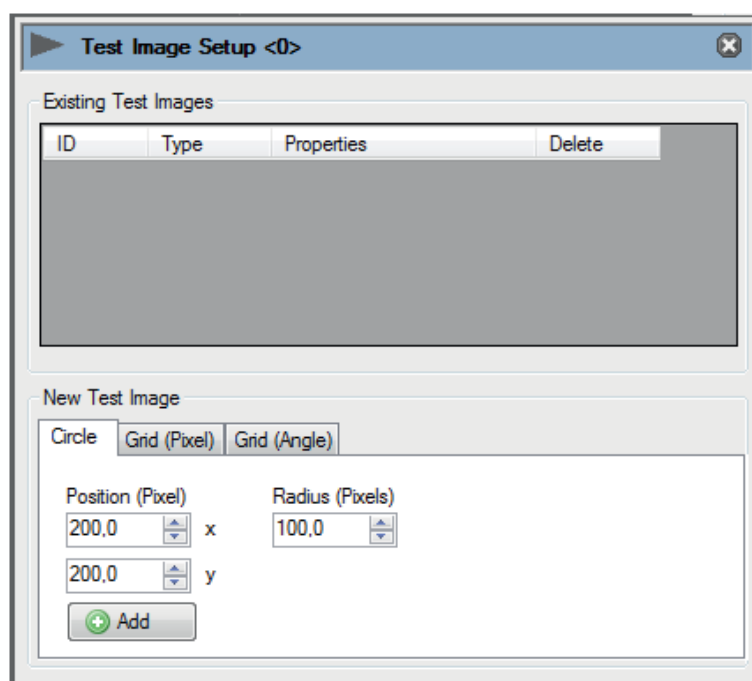


Figure 9-31. Test Image Setup window

Circle test pattern

Circles can be added to calibration area to ease the setup. The position (x, y pixel coordinates) and the radius (pixels) can be specified. Figure 9-32 shows the Test Image Setup window with two circles added.

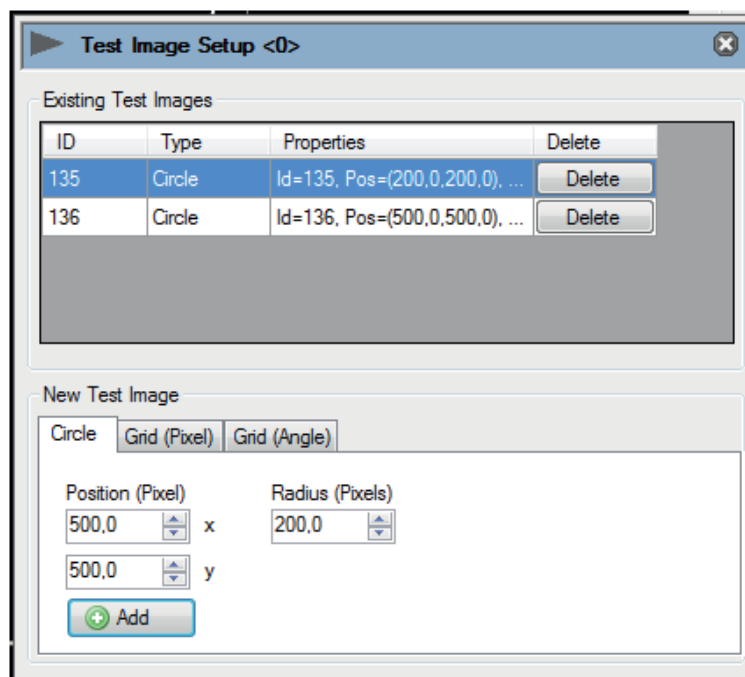


Figure 9-32. Circle test patterns

Grid (Pixel) test pattern

A grid with much smaller cells than the calibration grid can be really convenient for setup. Especially when using the Mesh Bezier Warp where it calibration can be done with very few control point.

To add a Grid (Pixel) select the “Grid (Pixel)” tab and specify your parameters (). The parameters are: offset (x, y in pixels for top, left corner) and height and width of the cells in the grid. Use the offset function to make grids in multiple MIPS units to overlap. See Figure 9-33

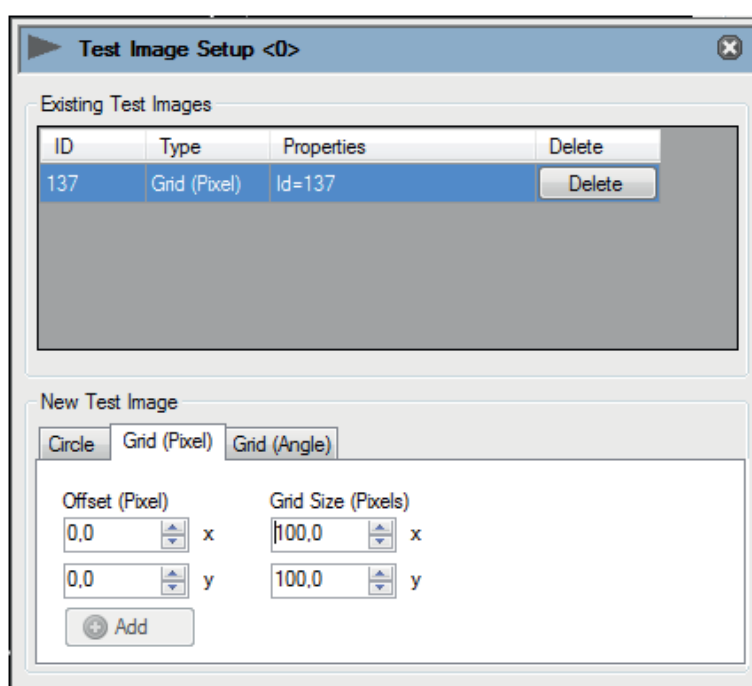


Figure 9-33. Grid (Pixel) test pattern

Grid (Angle) test pattern

The last test pattern available in the MIPS unit is the Grid (Angle) test pattern. This is used to create a reference grid in a dome or a cylinder.

Parameters to specify for this grid are 'to' and 'from' angles (in degrees) in horizontal and vertical direction. The frequency of the reference points can also be specified, as seen in Figure 9-34.

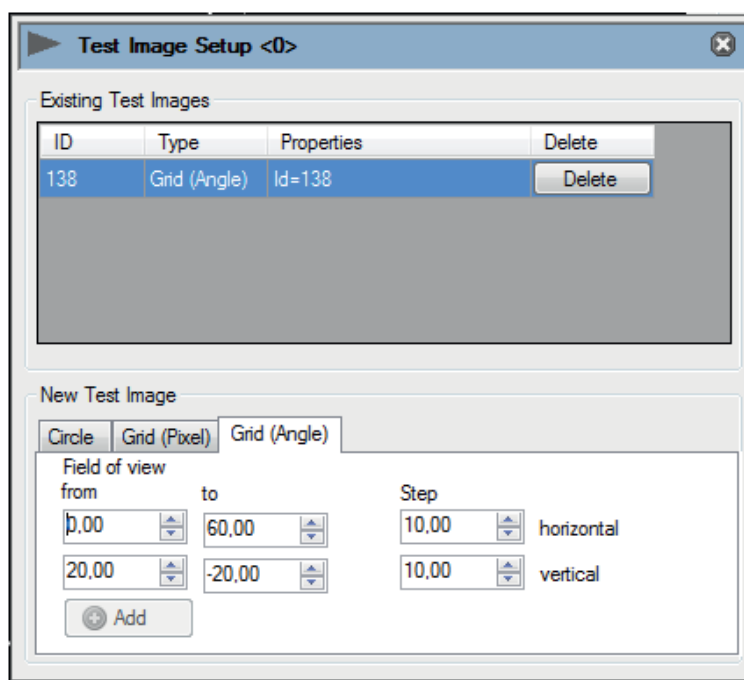


Figure 9-34. Grid (Angle) test pattern

Turning test patterns on and off

When using a test pattern it can be convenient to disable the warp calibration grid. Select "Layers" in the Calibration Panel toolbar and disable Warp, Figure 9-35.

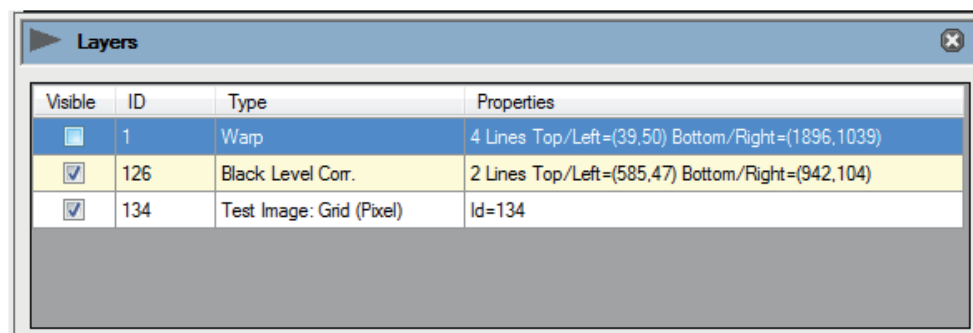


Figure 9-35. Disabling the warp grid

Black Level Management

Black Level Management (BLM) is a feature patented by projectiondesign for adjusting offset (brightness) in selected areas to compensate for non-perfect black levels in projectors. This enables the possibility to have seamless images in all the gradients of all colors.

To start the black level management tool, click on “Black Level” in the Calibration View Toolbar, Figure 10-36.

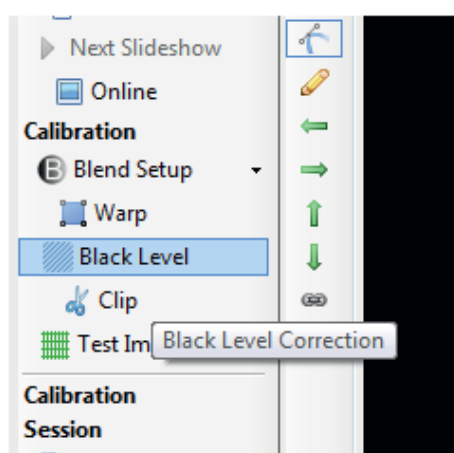


Figure 10-36. Start BLM tool.

Creating adjustment zones

Start with clicking “+” (Add) in the Calibration Panel Toolbar. This will create the first line in the area to black level correct, Figure 10-37.

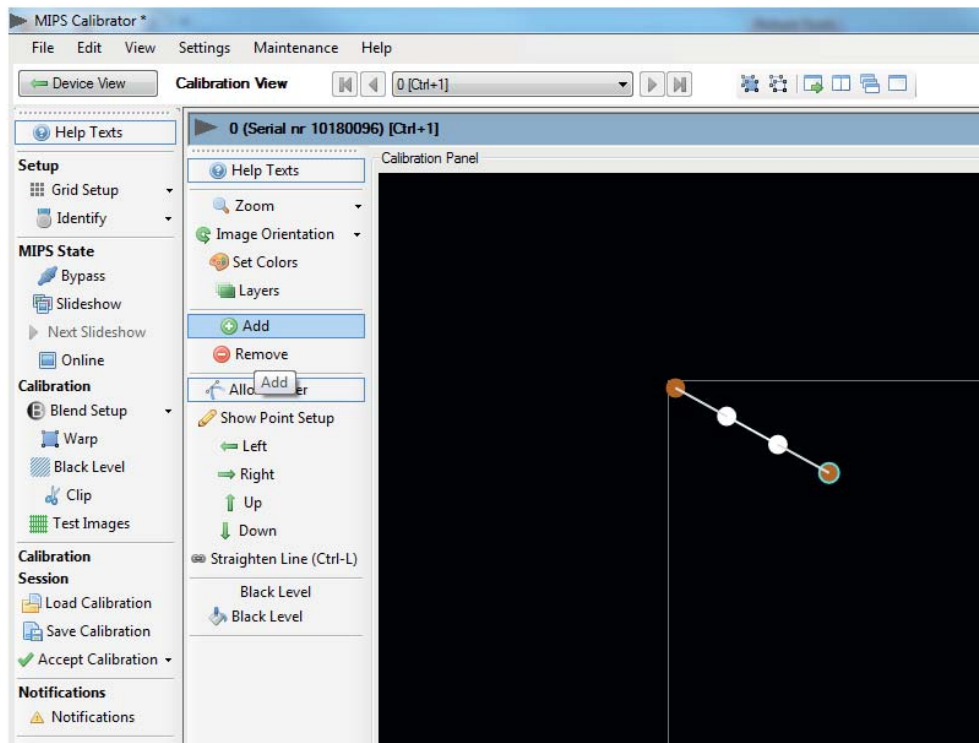


Figure 10-37. Adding Black Level Management lines.

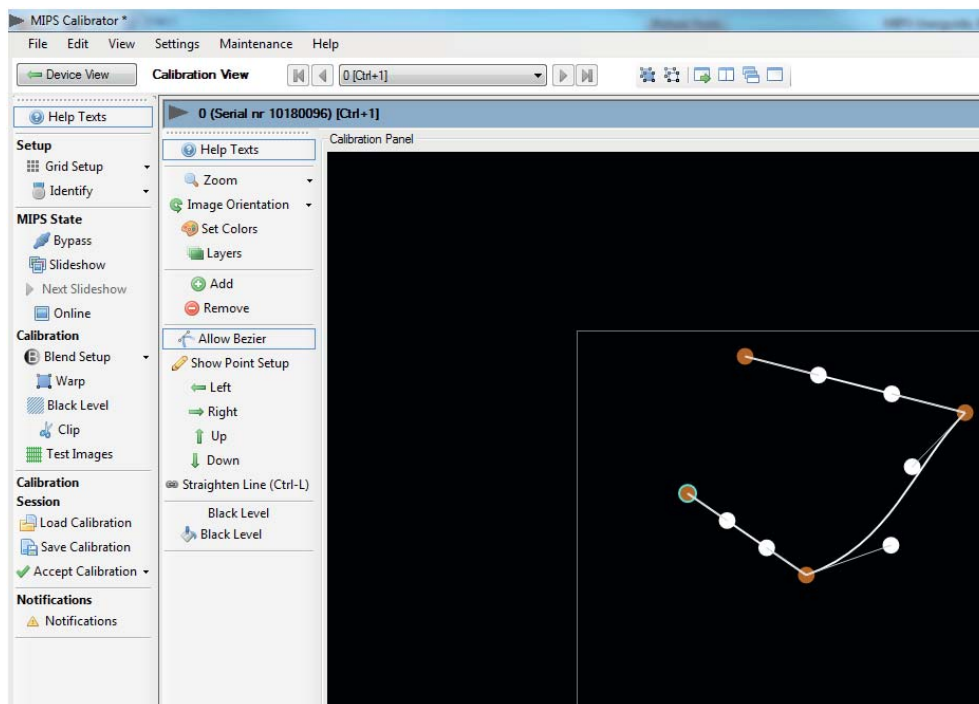


Figure 10-38. Multiple Black Level Management lines added.

To create the next side in the zone, click on one of the control points in the first line created (not the Bezier points) and then click “+” (Add) again (Figure 10-38). This will add other line to the calibration panel. Continue to add lines as needed. All these lines have the same controls as Bezier lines in the Mesh Bezier Warp and the Advanced Edge Blending.

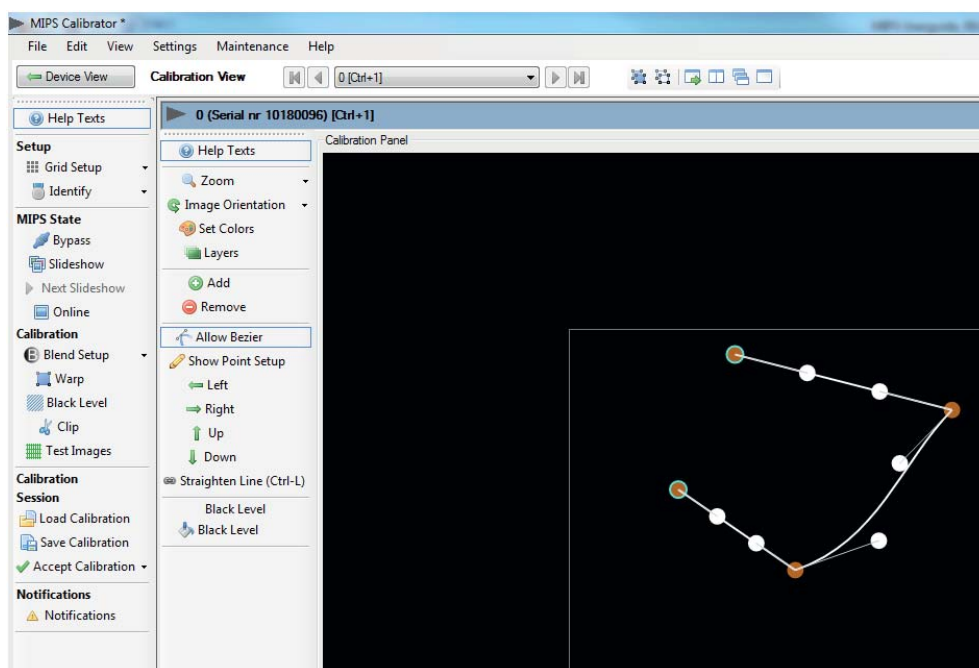


Figure 10-39. Connecting the first and last Black Level Management points.

Important! To add the last line connecting the first and last control point, it is important select both of the control points required to encapsulate the calibration area (Figure 10-39). To select multiple points, either press and hold Ctrl while using the mouse point to select points or drag and drop a selection rectangle over the points. Finally click “+” (Add) again to add the last line.

Removing BLM zones

To remove a BLM zone, select a complete zone by performing a drag and drop selection over a given zone. Individual points can also be select by pressing and holding Ctrl while selecting with mouse pointer.

Click “Remove” in the Calibration Panel Toolbar to remove the zone(s) selected. Individual lines in a zone can also be selected and removed.

Adjusting black level in a defined zone

To adjust the black level of a zone, select the one or many control points in the zone. Click “Black Level” in the Calibration Panel Toolbar. The window in Figure 10-40 appears. Adjust the 8 bit value (256 steps) as needed. You must enter online mode to see the results.

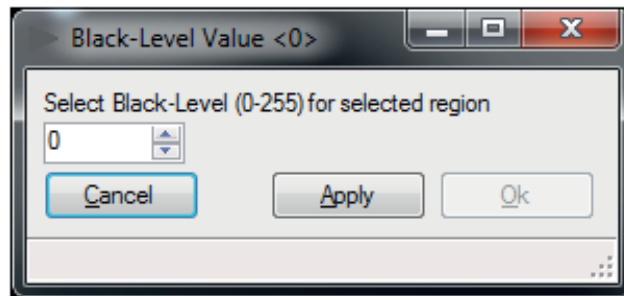


Figure 10-40. Adjusting black level.

Masking

Masking (also called clipping) is used to cut out areas of the image which should be blanked out. An example of this is overshooting of the image in a dome.

To start the masking tool, click “Clip” in the Calibration View Toolbar (Figure 11-41).

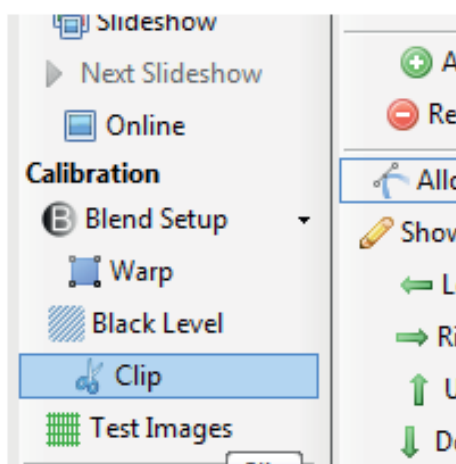


Figure 11-41. Starting the clip tool

Adding areas to clip

Start with clicking  (Add) in the Calibration View Toolbar. This will create the first line in the area to mask out (Figure 11-42).

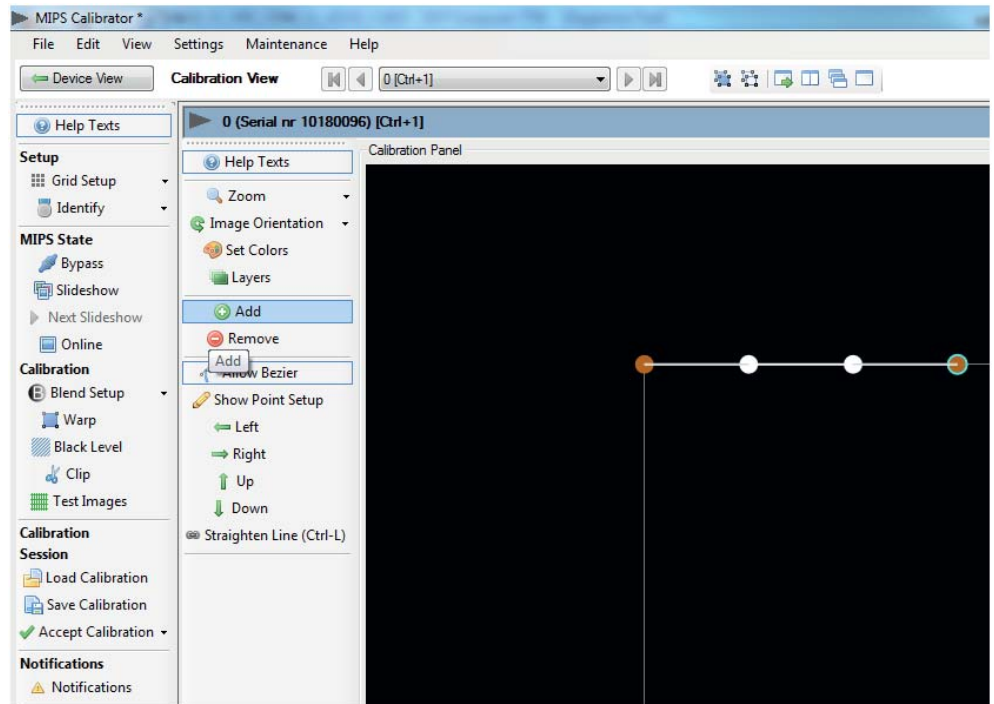


Figure 11-42. Adding the first line in a clip area.

To create the next side in the zone, click on one of the control points in the first line created (not the Bezier points) and then click  (Add) again (Figure 11-43). This will add other line to the calibration panel. Continue to add lines as needed. All these lines have the same controls as Bezier lines in the Mesh Bezier Warp and the Advanced Edge Blending.

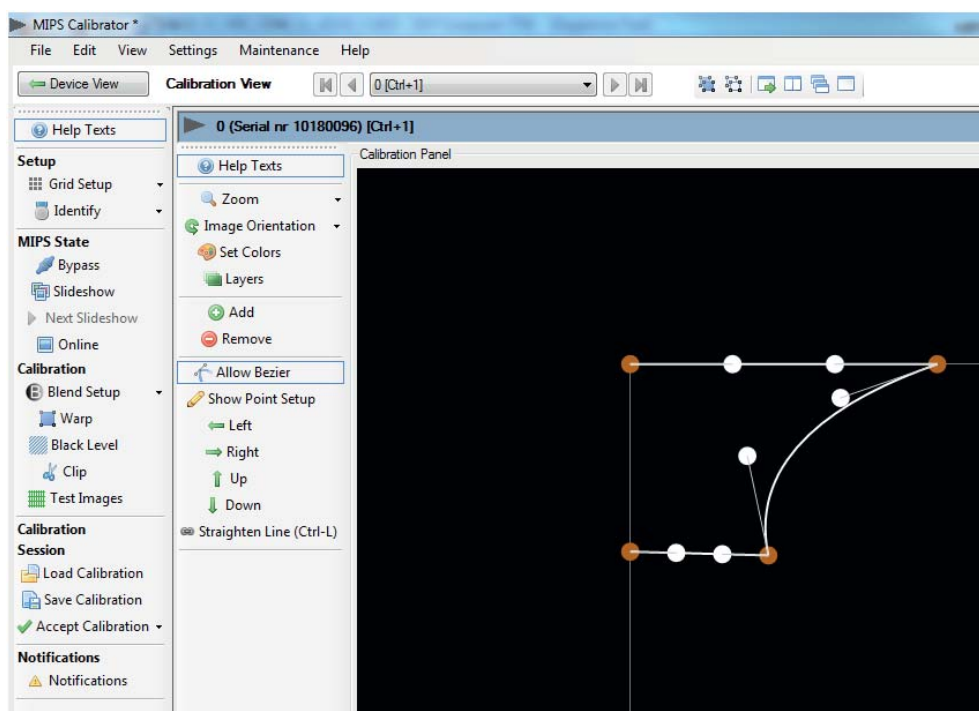


Figure 11-43. Adding multiple side in a clip area.

Note! To add the last line connecting the first and last control point, it is important select both of the control points required to encapsulate the calibration area (Figure 11-44). To select multiple points, either press and hold Ctrl while using the mouse point to select points or drag and drop a selection rectangle over the points. Finally click  (Add) again to add the last line.

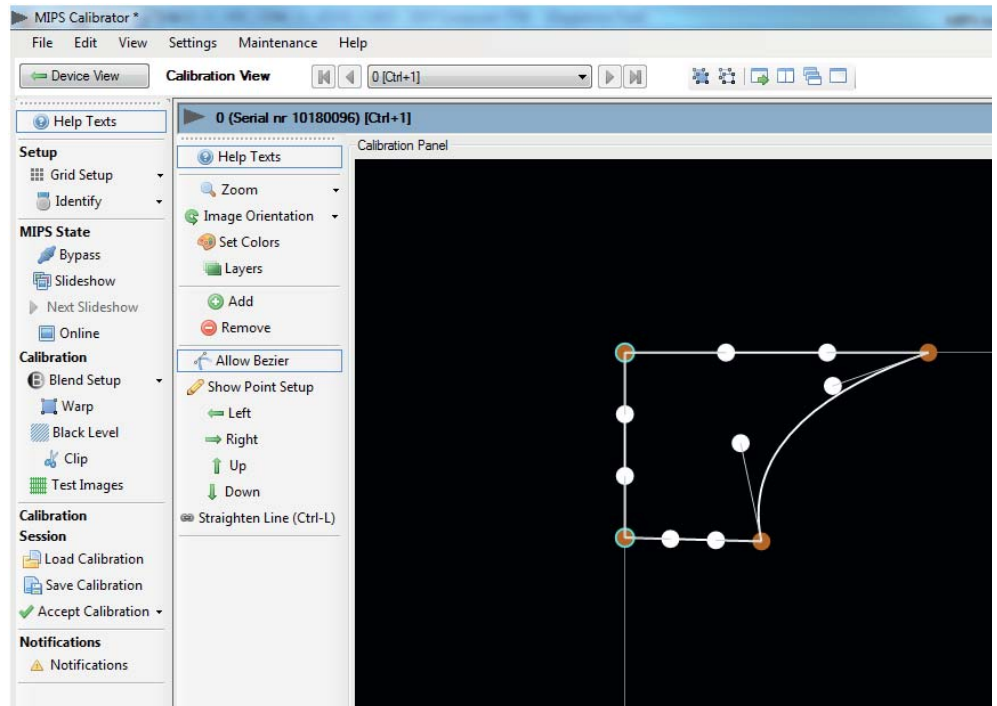


Figure 11-44. Clipping area complete.

Finally, go to online mode to see the results.

Removing clip areas

To remove a masked (clipped) area, select a complete area by performing a drag and drop selection over a given area. Individual points can also be select by pressing and holding Ctrl while selecting with mouse pointer.

Click “Remove” in the Calibration Panel Toolbar to remove the area(s) selected. Individual lines in an area can also be selected and removed.

Storing and recalling data

The MIPS system has powerful and flexible features for storing and recalling calibration data. When a calibration is stored, the user can recall all calibration parameters at any given time or on any given control PC. Calibration can be stored:

- In the MIPS unit.
- On the control PC. This is a copy of the data stored in the MIPS unit.
- Both.

Storing/recalling calibration to/from the MIPS unit

When storing calibration to the MIPS unit, it will be saved in the internal memory of the unit. Should the MIPS unit or the control PC lose power during calibration, the data can easily be recalled. To save the calibration to the MIPS unit click "Save Calibration" in the Calibration view toolbar, press Ctrl+S or select "Save Calibration" from the file menu (Figure 12-45). Any calibration already stored in the MIPS unit will be overwritten.

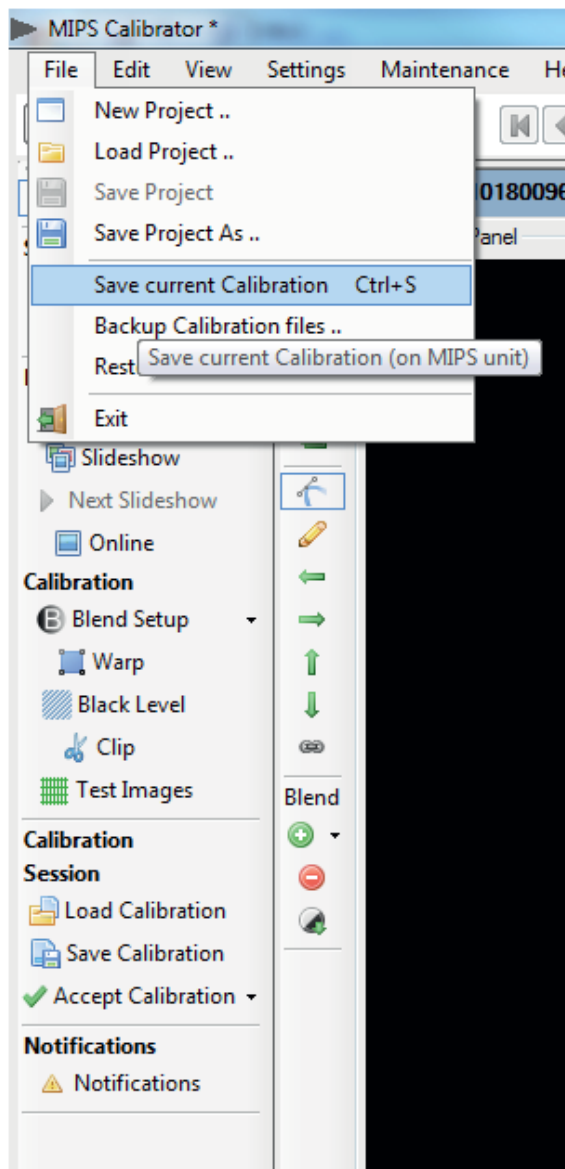


Figure 12-45. Save current calibration to the MIPS unit

If you want to recall your last saved calibration, click “Load Calibration” in the Calibration view toolbar (Figure 32).

Storing/recalling data to/from the control PC

Before you can save a calibration to the control PC, you first have to save your calibration to MIPS unit. When performing a backup to the control PC, the last data stored in the MIPS unit will be copied to the control PC. To backup your data, select “Backup Calibration files..” from the file menu (Figure 12-47). The window in Figure 12-47 will appear.

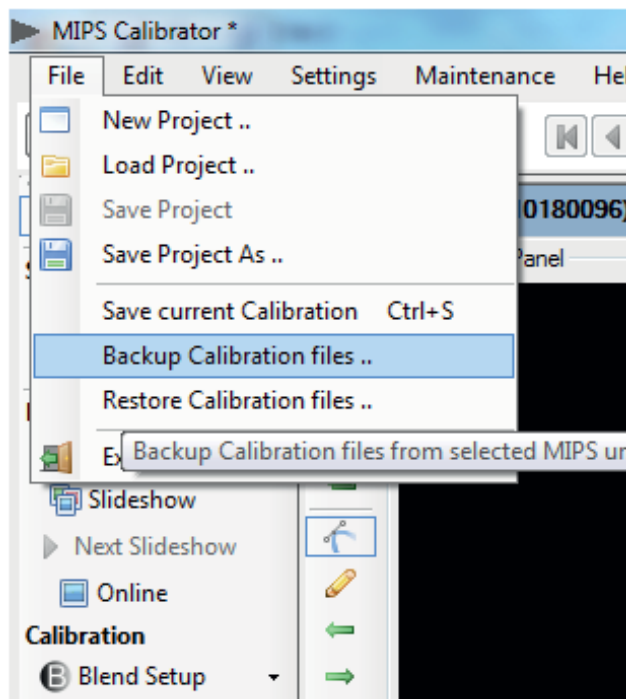


Figure 12-46. Backup up calibration data.

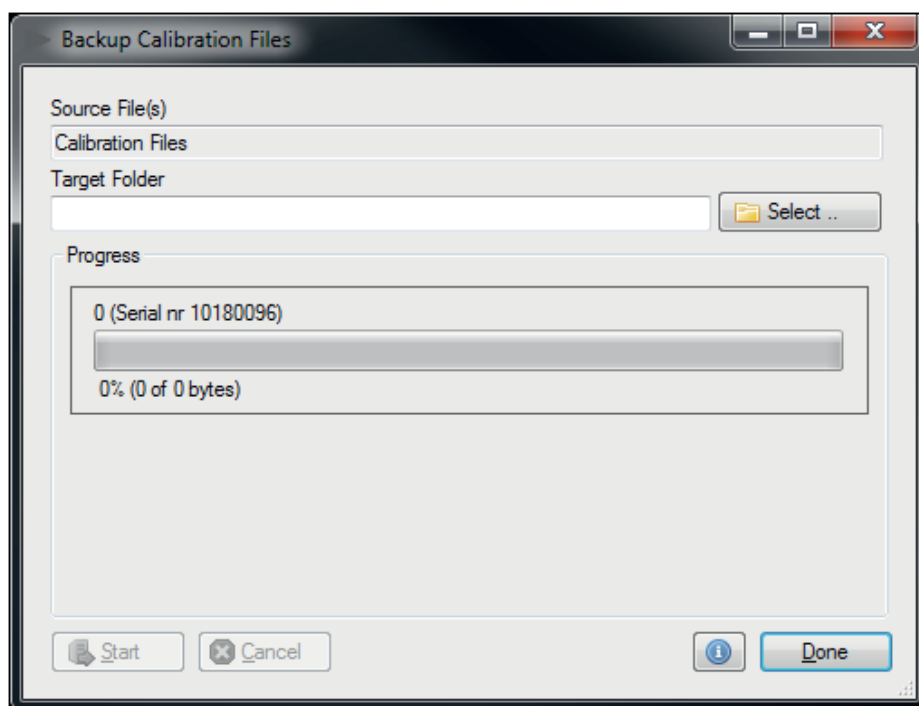


Figure 12-47. Selecting folder for backup

Select the target folder to which the data should be saved and press “Start”. When all files are copied to the control PC, click “Done”. Each unit the system will have to be upgraded separately. For revision tracking of the calibration data, each new backup folder should contain the date and time of the backup.

To restore the calibration files to the MIPS unit, select “Restore Calibration files..” from the file menu. The window in Figure 12-48 appears.

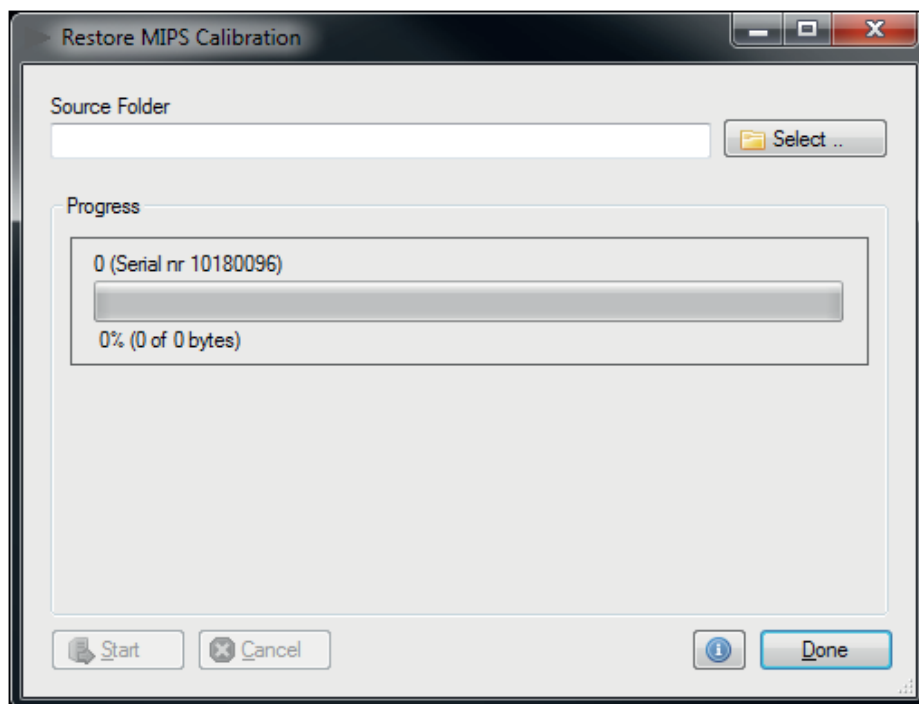


Figure 12-48. Restore calibration from control PC

Locate the calibration to be restored, and press “Start”. All calibration files from the selected backup folder will be copied to the MIPS unit.

IMPORTANT! After restoring a calibration from the control PC, the calibration has to be activated in the MIPS unit. This is done by selecting “Load Calibration” from the Calibration View toolbar.

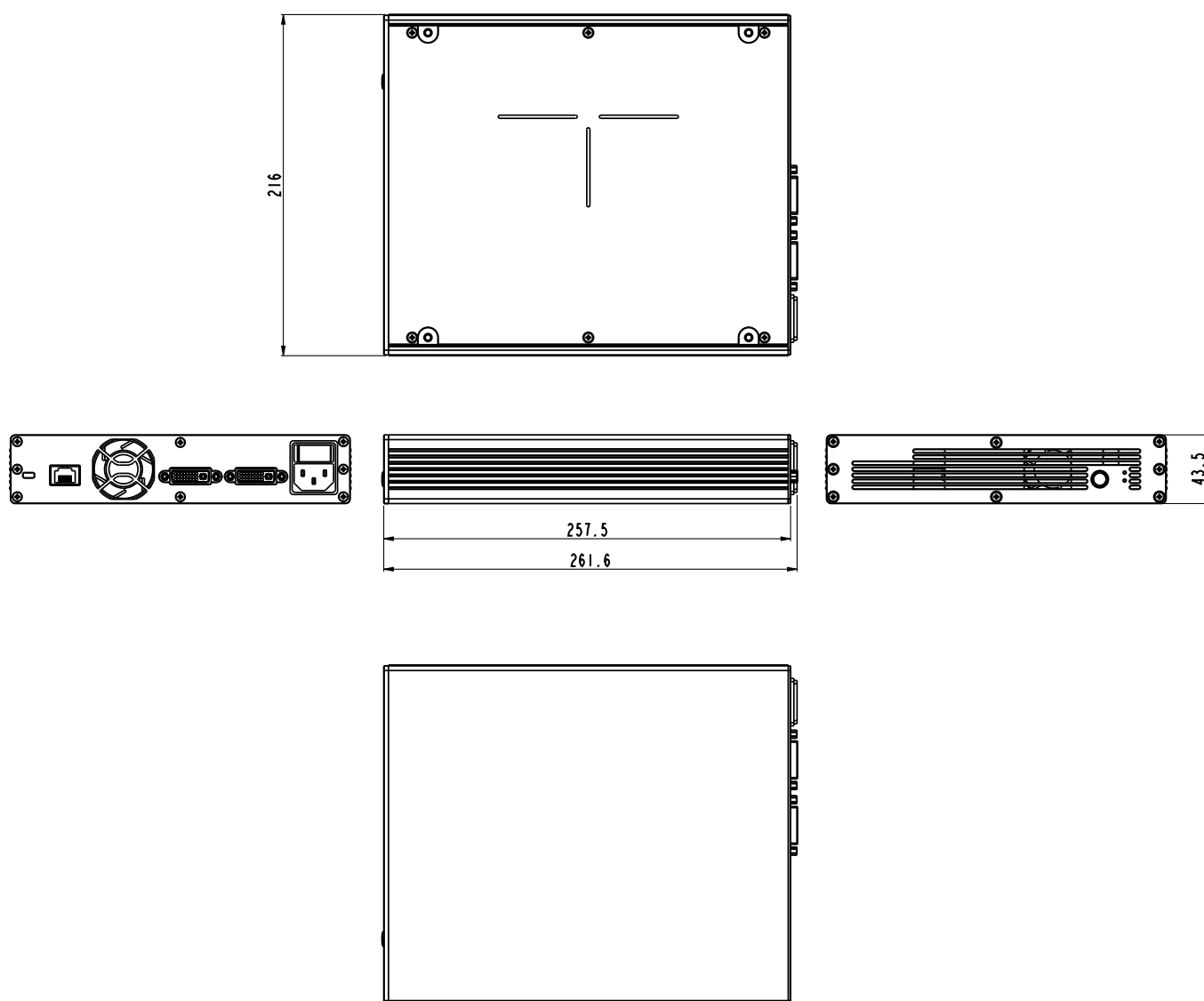
Technical specifications

Electrical

versions	101-0301-00 (WB2560) 101-0302-00 (WB1920)
functionality	Geometry Correction, Blending, Colour Correction and matching, Uniformity Correction and matching
scalability	Unlimited channels
latency	Zero with blended set up, rotation dependent with geometry correction
internal colour depth	12 bits per colour
I/O	Dual Link DVI in / out Ethernet (control) IEC power connector
colour correction	PLM™ – Pixel Level Matching™; individual RGB channel on pixel level
black level correction	Patented Pixel Level Matching; individual RGB channel on pixel level
maximum resolution	2560 x 1600 (WB2560) 1920 x 1200 (WB1920)
3D stereographic	1920 x 1200@ 120 Hz on WB2560 1280 x 800 @ 120 Hz on WB1920
setup and control	ProNet™ setup and calibration tool Automatic Camera setup (tba.)
filtering and scaling options – user selectable	4x4 Lanczos algorithm Bi-cubic interpolation Bi-linear interpolation
installation	1/2 width. 1RU rack mount. Rack mounting kit available
conformances	FCC Class A, CE, CUL
power requirements	100 - 120VAC, 200 - 240 VAC, 50/60 Hz, < 30W
size (H x W x D)	43.5 x 216 x 275.5 mm

All specifications are subject to change without prior notice.

Mechanical



Environmental

Operating tests					
Description	Min	Nom	Max	Criteria	Conclusion
Vibration random 5 - 500Hz Operating		g2/Hz 0,00052	0.5grms	30 min each axis, No mechanical or functional failures after test.	
Sine sweep vibration 10-1000Hz 2oct/min			3g	One sweep, all axis. No mechanical or functional failures after test.	
Shock Operating			5g/11ms	1500 shocks each side, total 9000shocks. No mechanical or functional failures after test.	
Humidity Operating	10%		80%	Non-condensing. 96 hours, test done in controlled 40°C environment No mechanical or functional failures after test.	
Temperature, operating	10°C		40°C	No thermal failures during test.	
Altitude, operating	0		3000m	(0-40°C – 0-3000moh) (0-35°C – 0-1500moh)	

Non-operating tests					
Description	Min	Nom	Max	Criteria	Conclusion
Vibration random 5 - 500Hz Non-operating		g2/Hz 0,0052 1.5grms		30 min each axis	
Sine sweep vibration 5-500Hz 1oct/min	-	0,5g	-	Dwell on resonance to do fatigue test. 30 min each resonance higher then 10 times input.	
Shock Non-operating	-	50g/20ms	-	Half sine (simulate packaging). 1 shock on each drop side.	
Bench drop	-	45° angle	-	10 drops on hard surface, selected orientations.	
Humidity Non-operating	10%		90%	Non-condensing. 96 hours, test done in controlled 40°C environment	

Transport packed tests					
Description	Min	Nom	Max	Criteria	Conclusion
Vibration random 5 - 500Hz - packed transport	-	g2/Hz 0,0052 1.5grms	-	180 min each axis	
Drop, packed free fall to concrete floor	-	96cm	-	All sides and two orthogonal corners	
Temperature, packed	-20°C		60°C	8 hours tempering	

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Figure 12-48. Restore calibration from control PC

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